

**WHAT IS CLAIMED IS:**

1                   1.       A fibrous composition, said fibrous composition comprising:  
2                   a fiber; and  
3                   a peroxycarboxylic acid functional group covalently attached to said fiber.

1                   2.       The fibrous composition according to claim 1, wherein said fiber is  
2                   a member selected from the group consisting of a natural material and a material derived  
3                   from natural material.

1                   3.       The fibrous composition according to claim 2, wherein said natural  
2                   material comprises a member selected from the group consisting of cellulose, starch,  
3                   chitosan, chitin, wool, and silk.

1                   4.       The fibrous composition according to claim 3, wherein said  
2                   cellulose is a member selected from the group consisting of cotton, rayon, tencel, flax,  
3                   hemp, and blends of the fibers with polyester and nylon.

1                   5.       The fibrous composition according to claim 1, wherein said fiber  
2                   comprises polyvinyl alcohol.

1                   6.       The fibrous composition according to claim 1, wherein said  
2                   peroxycarboxylic acid functional group is derived from an organic acid having at least  
3                   two carboxyl groups.

1                   7.       The fibrous composition according to claim 1, wherein said  
2                   peroxycarboxylic acid functional group is derived from a monocarboxylic acid.

1                   8.       The fibrous composition according to claim 6, wherein said organic  
2                   acid is a member selected from the group consisting of a tetracarboxylic acid, a  
3                   tricarboxylic acid and a dicarboxylic acid.

1                   9.       The fibrous composition according to claim 1, wherein said fiber  
2                   has a plurality of peroxycarboxylic acid functional groups.

1                   **10.**     The fibrous composition according to claim 1, wherein said organic  
2 acid is a member selected from the group consisting of butane tetraacetic acid, citric acid  
3 and maleic acid.

1                   **11.**     The fibrous composition according to claim 10, wherein said fiber  
2 has at least two free carboxylic acid functions.

1                   **12.**     The fibrous composition according to claim 1, wherein said  
2 peroxycarboxylic acid functional group is a plurality of peroxycarboxylic acid functional  
3 groups.

1                   **13.**     A process for preparing an antimicrobial fiber, said process  
2 comprising:

3                   (b)     immersing a fiber in an aqueous treating solution comprising an  
4 organic acid; and

5                   (b)     treating said fiber with an oxidizing agent to produce a  
6 peroxycarboxylic acid function, thereby preparing an antimicrobial fiber.

1                   **14.**     The process according to claim 13, wherein said organic acid has at  
2 least two carboxyl groups.

1                   **15.**     The process according to claim 13, wherein said treating solution  
2 further comprises a catalyst.

1                   **16.**     The process according to claim 15, wherein said catalyst is selected  
2 from the group consisting of an acid catalyst and a basic catalyst.

1                   **17.**     The process according to claim 15, wherein said acid catalyst is a  
2 member selected from the group consisting of sulfuric acid, methanesulfonic acid and  
3 sulfonic acid.

1                   **18.**     The process according to claim 15, wherein said catalyst is an ion-  
2 exchange resin.

1                   **19.**     The process according to claim 15, wherein said catalyst is a  
2 member selected from the group consisting of sodium hydroxide and potassium  
3 hydroxide.

- 1                   **20.**     The process according to claim 13, wherein said organic acid is a  
2 member selected from the group consisting of butane tetraacetic acid and citric acid.
- 1                   **21.**     The process according to claim 13, further comprising:  
2 removing the excess treating solution from said fiber prior to treating said  
3 fiber with an oxidizing agent.
- 1                   **22.**     The process according to claim 13, wherein said oxidizing agent is  
2 an aqueous solution of hydrogen peroxide.
- 1                   **23.**     The process according to claim 22, wherein said hydrogen peroxide  
2 is about 0.5% to about 30% by weight.
- 1                   **24.**     The process according to claim 13, wherein said oxidizing agent is  
2 an oxygen bleach.
- 1                   **25.**     The process according to claim 24, wherein said oxygen bleach is a  
2 member selected from the group consisting of hydrogen peroxide and sodium perborate.
- 1                   **26.**     The process according to claim 13, wherein said fiber is an article.
- 1                   **27.**     The process according to claim 26, wherein said article is a  
2 member selected from the group consisting of a surgeon's gown, a cap, a mask, a surgical  
3 cover, a patient drape, a carpeting, a bedding material, an underwear, a sock, a bandage, a  
4 pad, a sheet, and a uniform.
- 1                   **28.**     The process according to claim 13, wherein said fiber is cellulosic  
2 material.
- 1                   **29.**     The process according to claim 28, wherein said cellulosic material  
2 is a member selected from the group consisting of cotton, rayon, tencel, flax, hemp, and  
3 blends of the fibers with polyester or nylon.
- 1                   **30.**     The process according to claim 13, wherein said fiber is selected  
2 from the group consisting of chitosan and chitin material.
- 1                   **31.**     The process according to claim 13, wherein said antimicrobial  
2 activity is regenerable.